



The effectiveness of mindfulness therapy on rumination and distress tolerance in adolescent girls with high body mass index

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ABSTRACT

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Background and Aim: Overweight is a public health problem in developed and developing societies and has many psychological consequences, so this study was conducted with the aim of the effectiveness of mindfulness therapy on rumination and distress tolerance in teenage girls with high body mass index. **Methods:** It was a quasi-experimental study with a pre-test, post-test and two-month follow-up period with a control group. The statistical population included all overweight female teenagers in the second secondary school in two public schools in the 10th district of Tehran city in 2020-21, from which 30 people were selected by voluntary sampling and assigned in two groups of 15 people by simple random method. Became Data collection was done in addition to the demographic information checklist-researcher-made form with rumination questionnaire and distress tolerance questionnaire. 8 weekly sessions (2 sessions per week and each session for 1 hour) were performed for the subjects of the mindfulness therapy group, but the control group did not receive this intervention. The data were analyzed with the help of descriptive statistics methods; tests related to compliance with statistical assumptions and repeated measurement variance with SPSS version 26 statistical software. **Results:** The obtained results showed that rumination and its dimensions were significantly reduced in the experimental group compared to the control group in the post-test phase and this effect was stable in the follow-up phase as well ($p < 0.05$). **Conclusion:** Also, the results showed that there was a significant difference between the average distress tolerance score and its dimensions in the two groups in the post-test and follow-up phases ($p < 0.05$).



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Introduction

Marriage is the origin of creating a family life cycle (Waring, 2013) and healthy and lasting marital relationships indicate a directed system and a system of shared beliefs (Kang & Jawswal, 2019). While the spread of marital instability in today's society has caused many concerns (Amunii Oyafunek, Fala and Salav, 2014), high levels of marital conflicts have shown a direct relationship with marital tensions and instability (Frosakis, 2010). Marital stability is known as an indicator of the nature of mutual identity and the sharing of responsibilities and obligations of the spouses' past marital period. Therefore, marital stability is considered as a nuclear continuity and durability index of independence, mutual trust and friendship, and the factor of stability is considered as a predictor of marital happiness and happiness (Kang and Jaswal 2019). Marital stability is defined as the duration of each couple's marriage without divorce or separation (Mersado et al., 2018). Marital instability occurs when one or both members of a couple think about divorce or separation, or take actions that tend to end the marriage (Halog and Richer, 2020). Effective factors in marriage instability include: personal growth separated from each other and different interests, inability to talk with each other, spouse's personal problems and insufficient attention (Hawkins, Willoughby, and Doherty, 2012); husband's irresponsibility, infidelity, violence, alcoholism, causal relatives, unemployment, age difference and polygamy (Musa, Kisui, and Otor, 2015); Social and cultural differences, psychological, economic, health, sexual and conflict factors (Asa & Nekan, 2017).

Instability of marriage originates from transitory intra-personal and interpersonal factors. In the meantime, one of the factors affecting marriage instability is attachment. Attachment is a stable emotional bond between two people, so that one of the parties tries to maintain proximity to the attachment concept and act in a way to make sure that the relationship continues (Flanagan, 1999, cited by Nazari et al., 2010). Attachment behavior is activated when a person has feelings such as fear, sadness, and illness, and makes a person seek or stay close to a familiar person (Zimmerman & Baker, 2010). In the attachment theory, it is emphasized that early childhood relationships shape attachment styles and influence a person's view of himself, others, and

the way interpersonal relationships are organized (Yarnouz-Yaben, 2010). Three attachment styles, secure, avoidant and ambivalent, have been described in childhood and have been confirmed in adulthood. People with a secure attachment style are comfortable in establishing intimate relationships, show a desire to receive support from others, have a positive image of themselves, and have positive expectations and expectations from others. People with avoidant attachment style are considered emotionally cold and suspicious. They find it difficult to trust others and feel worried when others get too close to them. People with an ambivalent attachment style see themselves as misunderstood and lacking in self-confidence, and worry about being abandoned or not truly loved by others. (Marcus, 2013). Studies based on developmental pathology also emphasize the relationship between early negative educational and family experiences and the problems of adults in performing developmental tasks and psychological problems and defective marital networks (Yang, Klasko & Wishar, 2013). One of the methods of coping with stress that has been the focus of researchers in relation to the quality of marital relationship is coping styles (Pitt and Kaiser, 2016). Stress as a psychological phenomenon is one of the important factors in the occurrence of many mental disorders (Solaz, Salten, and Garachaga, 2012). Therefore, in recent years, stress and strategies to deal with it, which has a significant relationship with the quality of life, have received much attention in different groups (Cheng, Ku, and Lee, 2012). Employees of military families and their families bear additional stress due to being in the military, among the reasons for their increased stress are factors such as the following: Participation in war and critical missions, successive migration, worry about loss, conflict between home and work environment, distance from family and lack of individual freedoms (Ahmadi et al., 2006). These coping methods, which are learned and acquired and genetic factors also play a role, may change and develop. The family plays an important role in children's practice of coping with stressful events (Yousfi, Ghorbani, and Azizi, 2018). Coping methods are cognitive and behavioral strategies used by people to control a controlling life situation, these coping methods are learned and acquired. Genetic factors also play a role in it, it may change and grow. Lazarus

and Folkman (1998) defined coping strategies as a set of behavioral and cognitive responses that aim to minimize the pressures of stressful situations. According to their opinion, there are two main methods of coping with stress, which are known as problem-oriented and emotion-oriented coping methods. Problem-oriented coping style refers to behaviors and cognitions whose purpose is to change the stressful situation or variable. This style has two components. The first component is preparation, in which information search and planning are done. The second component is called action, in which problem solving and active coping takes place and includes strategies such as collecting, organizing and interpreting information. Emotion-oriented coping style includes behaviors and cognitions in which the goal is to change a person's response to a stressor. Its strategies include thinking about oneself, daydreaming, and focusing on emotional aspects (Aghapour et al., 2018). Any coping strategies include many activities. However, most of them show an attempt to improve a difficult situation such as: Designing a plan and practical action (problem-oriented coping) or to regulate emotional helplessness such as seeking others for emotional support or reducing the severity of the situation cognitively (emotion-oriented coping). Effective coping strategies make a person's reaction to stress levels appropriate (Ahmadi & Mehrabi, 2020).

But the question raised here is, how do these factors affect the process of marital life instability? Mediation models seem to be able to provide a suitable explanation for this process. A mediation hypothesis tries to identify the mechanism underlying the observed relationship between two variables. One of the internal factors that is considered as a positive psychology construct is psychological resilience. In the past decades, the role of resilience in growth and health has been proven, and recently it has found a special place in the field of family (Hosseini & Hossein Chari, 2011). Block and Block (1980) in the definition of resilience say: It is a personality trait that helps a person adapt to environmental changes and stresses. They believe that people with the characteristic of psychological resilience can choose easier methods in life, because they develop problem-solving skills and show more resistance to stressful situations (Ogelman & Errol, 2015). Research results indicate that resilience is a

construct that is related to many aspects, including marriage and family therapy (Kris et al., 2015). The results of research regarding the relationship between resilience and the family and spouses' relationships indicate that resilience can predict marital satisfaction (Mikaili et al., 2012). Resilience helps individuals and spouses to be less affected by adverse events. Spouses who do not have the characteristic of resilience do not have the ability to adjust the adverse conditions and stresses caused by marital problems, which increases conflicts and marital dissatisfaction (Gatezadeh et al., 2014).

Finally, according to the mentioned contents and the increasing growth of marital conflicts and jeopardizing the family center, in addition to personal injuries, it will also lead to social injuries. Considering the difficult conditions that the families of police forces are facing and taking into account the fact that, based on the researcher's investigations, no research was found that predicted the instability of married life based on the variables of the present study. Therefore, the current research aims to answer the question whether the instability of married life can be explained in the form of a model based on attachment styles and coping styles: the mediating role of resilience in conflicted couples?

Today, despite the important developments in the lifestyle of teenagers, statistics show an increase in numerous behavioral and emotional problems in this segment of society, especially in the field of overweight (Fiamani and Milo, 2021). During the last few decades, researchers and therapists have tested several methods in order to improve behavioral and psychological indicators in teenagers and adults with high body mass index. Although most studies have achieved positive results in the short term (post-test). However, some of these studies have many methodological problems and make it difficult to decide on the sustainability of these interventions in the long term (follow-up period) and outside the study environment, and often the results are confusing and contradictory. (Sanderson, 2013, translated by Jamhari et al., 2019).

Meanwhile, some studies have shown that treatments derived from the third wave of cognitive-behavioral therapy have been beneficial in improving mental and behavioral conditions in many clinical and normal populations over the past few years. (Britt et al., 2021), but there is no statistically accurate

information regarding the effect of these methods and the difference in their effect on the mental structures of overweight patients.

In fact, nowadays one of the most widely used approaches used by therapists to reduce the problems of clinical and normal populations is mindfulness. In this treatment method, mindfulness is an intervention that can be used in combination with cognitive behavioral therapy (Doherty, Lelloid, Andruins and White, 2019). This treatment was compiled by Segal, Williams and Teasdel (2002) and includes various meditations, preliminary education about depression, body inspection exercises and some cognitive therapy exercises. It shows the connection between mood, thoughts, feelings and body sensations. Contrary to cognitive-behavioral therapy, mindfulness encourages people not to judge feelings and false beliefs, and it is effective for different populations due to specific mindfulness exercises and a specific attitude framework. (Ogata et al., 2018). Therefore, the main question of the current research is whether mindfulness therapy is effective on rumination and distress tolerance in adolescent girls with high body mass index.

Method

This research is an applied type and a quasi-experimental research method that was conducted with a pre-test-post-test design with a control group and a two-month follow-up. The statistical population of the present study included all overweight girls (high body mass index) who were studying in the second secondary school in two public schools in Tehran's ten district in the period of 2021-2022.

In this research, firstly, questionnaires were distributed among overweight girls (high body mass index, i.e. 22 or higher) who were studying in the second secondary level and in two public schools in Tehran's 10th district. Then, 30 girls who met the entry criteria were selected by voluntary sampling and randomly assigned to two experimental and control groups.

The criteria for entering the research include: The subject's satisfaction and willingness to participate in the research; age range from 13 to 18 years; having a body mass index of 22 and above; Completing the questions of the research tools and getting a high score in the self-reporting tools, the ability to participate in the designated intervention sessions, and speaking in Farsi language. Exclusion criteria: The lack of satisfaction and desire of the subject to participate in the study; Being overweight due to medical diseases such as endocrine disorders; Abuse of any drug or tobacco; taking psychiatric drugs for at least 3

months; Distortion or incompleteness of the answered instrument and absence of more than 2 sessions of participation in intervention sessions and participation in psychotherapy programs during the last 6 months or simultaneously with the implementation of the present study.

Materials

1. Distress Tolerance Questionnaire (DTS): This self-report tool was developed by Simmons and Gaher in 2005 to measure distress tolerance. This tool has 15 questions with 4 subscales of tolerance, absorption, evaluation and adjustment. Questions No. 1, 3 and 5 related to the tolerance component; Questions No. 2, 4 and 15 related to the absorption component; Questions No. 6, 7, 9, 10, 11 and 12 related to the evaluation component; Questions No. 8, 13 and 14 are related to the adjustment component. The scoring of this tool is done on a 5-point Likert scale. The creators of the Cronbach's alpha coefficient of the whole questionnaire have reported 0.82 and its subscales in a range between 0.70 and 0.82. In several studies in Iran, the psychometric properties of this tool have been confirmed. (Karami et al., 2020). In the study of Mahmoudpour et al. (2020), the Cronbach's alpha coefficient of the entire questionnaire was calculated as 0.71.

2. Rumination Response Style Questionnaire (RRS): This self-report tool was developed by Hoeksma and Marrow in 1991 to measure rumination. This questionnaire has 22 questions with 3 subscales of distraction, reflection and self-indulgence. Questions No. 1, 3, 4, 6, 8, 9, 14, 17, 18 and 22 related to the distraction component; Questions No. 2, 7, 11, 12, 20 and 21 related to the reflection component; Questions No. 5, 10, 13, 15, 16 and 19 are related to the self-eating component. The scoring of the questionnaire is done on a 4-point Likert scale. Based on empirical evidence, the rumination questionnaire has high internal reliability. Cronbach's alpha coefficient is in the range between 0.88 and 0.92. The reliability of the questionnaire was reported by Cronbach's alpha method between 0.82 and 90. In Iran, its high reliability has been reported in various studies (Samadian et al., 2021). In the study of Samadian et al. (2021), the Cronbach's alpha coefficient of this tool was reported as 0.79.

3. Mindfulness therapy: The summary of the content of mindfulness therapy used in this research is presented in the table below.

Table 1. Summary of the content of mindfulness training sessions

meeting (objectives of the meeting)
The first session - introducing the participants and a brief description of the training program, setting the desired agreements and expectations and building trust, the technique of eating raisins, and then meditation for 30 minutes and talking about the feelings caused by doing it.
Second session - discussion of mindfulness and education and its effects, time management and planning to do things, sitting meditation and discussion about avoidance, discussion about the difference between thoughts and feelings.
The third session - the exercise of seeing and hearing (in this exercise, the person is asked to look and listen in a non-judgmental way for 2 minutes), continue sitting meditation and breathing together, paying attention to the physical senses.
The fourth session- carrying out one of the mindfulness exercises in order to improve thinking ability and mindfulness of new daily activities and unpleasant events.
The fifth session - mindfulness and rumination and the effects of rumination on procrastination, four-dimensional sitting meditation (sitting meditation with attention to breathing, body sounds and thoughts).
Sixth session - discussion of stress and methods of managing and solving it, practicing mindful walking
Seventh session - continuation of sitting meditation exercises, presentation and implementation of body awareness movements, presentation of an exercise entitled creating-thought-separate views with the theme that the content of thoughts are mostly not real. Accepting feelings as feelings.
The eighth session - motivational awareness (focusing on internal and external self-stimulators that lead to procrastination), identifying negative emotions and managing them.

Implementation

In order to comply with the ethical principles of the research in order to protect the rights of the subjects, the necessary clarifications regarding the objectives of the research and the procedure of its implementation were presented to all the subjects. The absence of coercion and the right to participate or not to participate in the research was specified for all participants. In addition, all of them were assured that the obtained personal information will remain confidential and that the data that will be published will be without private identifiers and will be analyzed in a group form and with the confidentiality of individual characteristics. After obtaining oral consent and consent, self-report questionnaires were distributed among the subjects and collected after completion. For data analysis, in addition to descriptive statistics and demographic information, statistical assumptions test was used, and according to

the results of statistical assumptions, it was decided that two-way mixed analysis of variance was used. SPSS version 26 software was used.

Results

The number of women participating in the research is equal to 150 (50%) and the number of men participating in the research is equal to 150 (50%). The average age of all participants is 31.55 with a standard deviation of 5.87. The average age of female participants in the research is 30.08 (with a standard deviation of 5.55) and the average age of male participants is 33.03 (with a standard deviation of 5.83). 53 of the participants had a degree lower than a diploma (17.7 percent), 144 had a diploma (48 percent), 73 had an associate's degree (24.3 percent), and 30 had a bachelor's degree (10 percent).

Table 2. Average and standard deviation of the research variables by group and measurement stages

Research variable	Group	N	Pre-test	Post-test	Follow-up
			Mean and SD	Mean and SD	Mean and SD
Distraction component	Mindfulness	15	20/04 ± 3/83	16/53 ± 1/70	16/59 ± 1/76
	Control	15	19/32 ± 4/10	19/28 ± 3/37	19/30 ± 2/44
Reflection component	Mindfulness	15	15/75 ± 2/94	12/16 ± 1/25	12/14 ± 1/39
	Control	15	15/63 ± 2/27	15/60 ± 2/85	15/58 ± 2/66
	Mindfulness	15	16/98 ± 2/13	12/49 ± 1/28	12/44 ± 1/47

Self-eating component	Control	15	18/44 ± 2/14	18/±50 2/50	18/49 ± 2/32
	Mindfulness	15	52/77 ± 8/90	41/18 ± 4/23	41/17 ± 4/62
Rumination	Control	15	53/39 ± 8/51	53/38 ± 8/72	53/37 ± 7/42
	Mindfulness	15	10/19 ± 1/53	12/34 ± 1/66	12/30 ± 1/37
Endurance component	Control	15	8/33 ± 1/15	8/00 ± 1/58	8/08 ± 1/76
	Mindfulness	15	8/00 ± 1/56	12/15 ± 2/37	12/17 ± 2/74
absorption component	Control	15	7/59 ± 1/18	7/49 ± 2/43	7/27 ± 2/11
	Mindfulness	15	9/65 ± 2/17	10/11 ± 2/23	10/12 ± 1/65
Evaluation component	Control	15	10/52 ± 1/83	10/33 ± 1/45	10/38 ± 1/60
	Mindfulness	15	8/23 ± 1/44	10/46 ± 1/39	10/48 ± 1/50
Adjustment component	Control	15	7/56 ± 1/94	7/53 ± 1/48	7/56 ± 1/60
	Mindfulness	15	36/07 ± 6/70	45/06 ± 7/65	45/07 ± 7/26
Tolerate distress	Control	15	34/00 ± 6/10	33/35 ± 6/94	33/29 ± 7/07

In this research, Shapiro-Wilk and Kolmogorov-Smirnov tests were used before performing variance analysis in order to check the assumption of normality of the distribution of grades in the society. The results show that in all dependent variables, the significance level is greater than 0.05 ($P < 0.05$), so the distribution of scores in the society is normal. Therefore, the use

of variance analysis in research data is unimpeded. The Mbox test also showed that the assumption of homogeneity of the variance-covariance matrix is maintained. (Distress tolerance ($P=0.338$, $F=2.518$ and $\text{BoxM}=5.609$) and rumination ($P=0.149$, $F=0.701$ and $\text{BoxM}=4.766$)).

Table 3. The results of Levene's test regarding the assumption of homogeneity of variances error

The dependent variables	F	Df1	Df2	Sig
Distraction component	0/686	2	42	0/488
Reflection component	1/543	2	42	0/639
Self-eating component	1/169	2	42	0/289
Rumination	1/674	2	42	0/512
Endurance component	0/534	2	42	0/476
absorption component	1/033	2	42	0/089
Evaluation component	0/498	2	42	0/323
Adjustment component	0/265	2	42	0/712
Tolerate distress	1/480	2	42	0/423

** $p < .01$; * $p < .05$

Another premise for using analysis of variance is equality of variance of groups. The basis of the default equality of variances is that the variance of the scores of two groups in the society is equal and there is no statistically significant difference. In this research, before performing variance analysis, Levene's test was used to check the assumption of equality of variances, the results

of which are presented in Table No. 5. As can be seen in the above table, Levene's assumption is confirmed in all the dependent variables of the research, and due to the random assignment of two groups and the appropriate sample size, the analysis of variance method can be used to analyze the hypotheses.

Table 4. The result of Mochli's sphericity test of research variables

Research variables	Mauchly	Chi-square	Df	Sig
Distraction component	0/692	27/332	2	0/005
Reflection component	0/291	11/645	2	0/001
Self-eating component	0/723	16/940	2	0/012
Rumination	0/211	42/993	2	0/001
Endurance component	0/666	12/537	2	0/001
absorption component	0/498	9/088	2	0/001
Evaluation component	0/716	11/076	2	0/001
Adjustment component	0/685	14/812	2	0/001
Tolerate distress	0/267	26/967	2	0/001

Based on the above table, Mauchly's sphericity test has obtained a significance level value of 0.001 for each of the dependent variables of the research; Therefore, the assumption of sphericity is rejected. As a result, the assumption of the sameness of the variances and more precisely, the condition of the homogeneity of the

covariance matrix was not ensured and a violation of the F statistical model was made. Therefore, alternative tests, i.e. the conservative Greenhouse-Greiser test, were used to investigate the within-subject effects of the treatment, the results of which are shown in the table below.

Table 5. Results of variance analysis of repeated measurement of research variables in three stages of implementation

Research variables	Source	F	Sig	Effect size	Estimated power
Distraction component	Stage	3/066	0/034	0/423	0/015
	Stage*Group	5/893	0/022	0/107	0/199
	Group	10/541	0/018	0/455	0/259
Reflection component	Stage	8/754	0/040	0/714	0/276
	Stage*Group	22/055	0/036	0/276	0/410
	Group	23/394	0/044	0/457	0/332
Self-eating component	Stage	4/231	0/023	0/443	0/334
	Stage*Group	0/670	0/019	0/276	0/187
	Group	7/857	0/025	0/305	0/054
Rumination	Stage	0/907	0/019	0/041	0/451
	Stage*Group	14/695	0/011	0/624	0/871
	Group	11/675	0/044	0/146	0/548
Endurance component	Stage	27/844	0/001	0/660	0/865
	Stage*Group	175/594	0/001	0/807	0/880
	Group	53/995	0/001	0/720	0/865
absorption component	Stage	34/850	0/001	0/624	0/865
	Stage*Group	50/765	0/001	0/547	0/865
	Group	24/598	0/001	0/539	0/865
Evaluation component	Stage	20/318	0/001	0/492	0/865
	Stage*Group	102/791	0/001	0/710	0/865
	Group	45/238	0/001	0/683	0/913
Adjustment component	Stage	21/786	0/001	0/467	0/802
	Stage*Group	53/340	0/001	0/599	0/811
	Group	11/924	0/001	0/613	0/845
Tolerate distress	Stage	31/108	0/005	0/526	0/599
	Stage*Group	91/654	0/004	0/716	0/969
	Group	43/458	0/004	0/608	0/734

The results of the above table show that the intervention method (mindfulness therapy) made a significant difference in the three stages of measurement: in rumination scores ($F=0.907$; $Sig=0.019$); distraction component ($F=3.066$; $Sig=0.231$); reflection component ($F=8.754$; $Sig=0.218$); Self-eating component ($F=4.231$; $Sig=0.454$); created two groups (intervention

group and control group). This means that mindfulness treatment has had a significant effect on improving the total score of rumination and its dimensions. The results of this table show that mindfulness treatment has made a significant difference in the three stages of measurement in the total distress tolerance score ($F=31.108$; $Sig=0.005$) and each of its dimensions.

Table 6. Results of Bonferroni's post hoc test in different measurement stages for research variables

Research variables	Adjusted mean	Tests	Mean diff	Sig	
Rumination	Pre-test	33/10	Pre-test – Post-test	1/333*	0/001
	Post-test	09/13	Pre-test – Follow-up	1/332*	0/005
	Follow-up	67/14	Post-test – Follow-up	-0/200	0/099
Tolerate distress	Pre-test	19/18	Pre-test – Post-test	3/533*	0/001
	Post-test	93/20	Pre-test – Follow-up	3/333*	0/001
	Follow-up	44/21	Post-test – Follow-up	0/199	0/344

In order to determine in which stage the total score of the dependent variables of the research has a significant difference, Bonferroni's post hoc test was used to compare the averages two by two. The above table shows that the intervention method of mindfulness therapy had a significant effect on the total score of the dependent variables of the research in both the post-test and follow-up stages. "Mean difference between pre-test and post-test" and "Mean difference between pre-test and follow-up" are more than "Mean difference between post-test and follow-up". It shows that this method did not affect the total score of rumination in the post-test phase, but it did affect the tolerance of distress, and the continuation of this effect is also maintained in the follow-up phase.

Conclusion

This study was conducted with the aim of investigating the effectiveness of mindfulness therapy on rumination and distress tolerance in teenage girls with high body mass index. The first finding of the present study showed that mindfulness treatment was beneficial in reducing the rumination score and its dimensions in the two stages of post-test and follow-up in the experimental group, unlike the control group. Researches have confirmed the role of rumination in the initiation and continuation of many mood and anxiety disorders in adolescents and adults. Rumination with depressing content is responsible for half of the cases of depression in women compared to men. Rumination often involves grappling with past losses, analyzing past mistakes, comparisons, and social-value judgments. Rumination is unwanted,

unstoppable, incessant and repetitive. Commonly reported consequences of rumination include sadness, distress and anxiety, decreased motivation, insomnia, increased fatigue, procrastination, self-blame, pessimism, and hopelessness. Therefore, reducing this factor can be very important in increasing the mental well-being of people. In the review of previous researches, there was no research that directly compares the effectiveness of schema therapy with mindfulness therapy on reducing rumination in girls. Therefore, the results of the present study are compared with the findings of similar studies. This research was consistent with the results of previous studies. Bemihndoost and Emke (2019), Hashemi (2018), Sundson et al. (2017), Clader-Mikos et al. (2019) and Tominia et al. (2020).

In a study in line with the current findings, Mihandoost and Amaki (2019) showed that mindfulness training has reduced rumination in students and has a significant effect on reducing rumination. Tominia et al. (2020) showed in line with the present finding in a research that using mindfulness skills reduces rumination in teenagers. Considering the positive and sustainable effects of mindfulness skills, special attention can be paid to the role of mindfulness in health-educational programs. Mental health programs with a focus on mindfulness can also be prioritized.

Baer's point of view can be cited in explaining the effectiveness of mindfulness therapy on rumination. According to Beer, mindfulness can be described as a way of knowing or being that involves understanding one's feelings.

Mindfulness requires special cognitive, behavioral and metacognitive strategies to focus the attention process. It, in turn, helps to prevent the downward spiral of negative mood-negative thinking and the tendency to worrisome responses, and causes the development of a new perspective and the emergence of pleasant thoughts and emotions. In fact, it seems that mindfulness is effective through attention control training. According to the differential activation theory, it is assumed that vulnerability to depression, obsession or rumination and negative self-critical and hopeless patterns of thinking, which in turn lead to changes in cognitive and neural levels. Mindfulness training teaches people how to remove the habitual skills located in the central motor from the rigid state and prepare the conditions for change by directing information processing resources towards neutral goals of attention such as breathing or feeling the present moment. Therefore, reapplying attention in this way prevents the increase or persistence of mood and rumination symptoms and makes faulty processing cycles less accessible. From the point of view of the presence of mind, sensory resources are like semantic patterns, and physical exercises change the shape of the schema model. In a standing position, calm and motionless and with regular and slow breathing, they change the internal sensory patterns of muscle receptors and the general pattern of codes in the schema model that is related to uncomfortable and difficult situations. As a result, when we focus our attention in mindfulness, the change of the problematic schema model reaches its peak and the stiffness and conflict created with the schema softens. Finally, it can be concluded that mindfulness stops the cycle of negative internal experiences such as rumination of an event in the past, and through that a person maintains his functional stability and shows the possibility of cognitive and emotional flexibility.

Another finding of the present study showed that the mindfulness treatment was beneficial in improving the distress tolerance score of the intervention group in the two stages of post-test and follow-up, unlike the group. This finding of the present research is in line with the studies of previous researchers such as Bernal et al. (2018) and Flat et al. (2020). Flatt et al.'s (2020) study, which showed that students in the experimental group who received mindfulness interventions had a lower level of psychological distress and a

higher level of adaptation to the university environment, was in line with the present finding.

In explaining the usefulness of mindfulness therapy on distress tolerance of sample people, it can be said that mindfulness is actually purposeful and non-judgmental attention to the experiences of the here and now, which is created through formal and informal exercises in daily life. Mindfulness therapy helps people face their negative emotions and thus increases the tolerance of distress in clients. Therefore, one of the mechanisms that can be effective in increasing distress tolerance is improving emotion regulation skills in these people. In interventions based on mindfulness, by applying meditation techniques such as mindfulness to breathing and increasing awareness of present experiences, it helps people to find the ability to cope successfully in times of crisis or experiencing stress. On the other hand, many mindfulness exercises such as body scanning or some yoga and meditation exercises help people to find the ability to accept their negative physical feelings. During these exercises, people learn to accept their direct sensory experiences instead of getting caught up in the mind's reaction in the form of avoiding confusion. They learn to increase the amount of receiving body messages and reduce the amount of mental confusion by directly sensing the body. In body scanning exercises, people learned to recognize early warning symptoms that may turn into a vicious circle and focus their attention directly on their feelings and emotions. This causes them to go along with their unpleasant feelings and not try to avoid them (Rostami et al., 2016). By learning the skill of accepting unpleasant emotions, people can develop and expand this skill. By using this skill, they can find the ability to accept their negative emotions and confusion and thus increase their distress tolerance (Khajezadeh & Sabahi, 2021).

On the other hand, people with training in mindfulness therapy increase their awareness of a meta-emotional construct called distress tolerance. In this way, he draws attention to it, evaluates it, and accepts and tolerates it when he cannot change the conditions. Emotions, in particular, regulate the force resulting from action tendencies in order to avoid or immediately weaken the experience and do not suffer from performance breakdown (Kano et al., 2020). Distress tolerance is a person's ability to

resist and experience negative psychological states (Kabat-Zinn, 1990), people with low tolerance describe distress as an intolerable construct. People with low distress tolerance can use the precipitation technique to observe themselves and then focus on the inner experience with acceptance. This technique is a mindfulness method for working with strong and difficult emotions, which deals with finding the right refuge when distress occurs. (Simmons & Gehr, 2005).

This study, like other studies, faced limitations. The limitation of the statistical population to overweight girls studying in public schools of the second secondary level and the limited number of participants in the project, which was caused by the methodological limitations of this study, limits the generalizability of the findings. instrument; It is suggested that in the next studies, the study population should be conducted among overweight female teenagers studying in public schools of the second secondary level in the city and with a simple random sampling method, so that the generalization of the results is high. One of the most important limitations of the current research, which can create ambiguity in some of its results, was the use of self-reporting tools in collecting information; It is suggested that this hypothesis be re-examined in future researches and other methods such as interviews should be used to measure research variables in addition to questionnaires.

Conflict of Interest

According to the authors, this article has no financial sponsor or conflict of interest.

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